

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

1-20. (*Canceled*)

21. (*Currently Amended*) A phase estimation system, the system comprising:

~~an input device a biological system configured to receive a signal produced by a biological system produce a bio-signal; and~~

~~a processing computing device configured to receive the bio-signal and determine a derivative of an estimated phase of the bio-signal, the estimated phase being indicative of a condition of the biological system, and configured to integrate the derivative; and derivative,~~

~~an output device configured to display the estimated phase.~~

wherein the estimated phase is displayed.

22. (*Currently Amended*) The system of claim 21, wherein the processing computing device is further configured to produce an estimated bio-signal of the biological system as a function of the estimated phase.

23. (*Currently Amended*) The system of claim 21, wherein:

the derivative of the estimated phase is a function of the bio-signal; and
the processing computing device is configured to subtract an estimated
bio-signal of the biological system from the bio-signal to produce the
function of the bio-signal.

24. (*Currently Amended*) The system of claim 23, wherein the processing computing
device is configured to subtract the estimated phase from a difference of the estimated
bio-signal subtracted from the bio-signal to produce the function of the bio-signal.

25. (*Currently Amended*) The system of claim 23, further comprising wherein the
estimated phase is output. a second output device configured to output the estimated
signal.

26. (*Currently Amended*) The system of claim 23, wherein the computing device further
comprising comprises:

a Kalman filter configured to reduce noise in a difference of the estimated
bio-signal subtracted from the bio-signal.

27. (*Currently Amended*) The system of claim 26, wherein the Kalman filter is
configured to produce a difference between a variable that represents a phase of the
bio-signal and a variable that represents the estimated phase.

28. (*Previously Presented*) The system of claim 22, wherein the function of the estimated phase comprises a sine function.

29. (*Currently Amended*) The system of claim 23, wherein the processing computing device is configured to multiply a first factor by a difference of the estimated bio-signal subtracted from the bio-signal to produce the function of the bio-signal.

30. (*Previously Presented*) The system of claim 29, wherein the first factor is equal to a product of a second factor multiplied by a third factor.

31. (*Previously Presented*) The system of claim 30, wherein the second factor is a function of the estimated phase.

32. (*Previously Presented*) The system of claim 31, wherein the function of the estimated phase is a cosine function.

33. (*Currently Amended*) The system of claim 30, wherein the third factor is a function of a difference between a variable that represents a phase of the bio-signal and a variable that represents the estimated phase.

34. (*Currently Amended*) The system of claim 33, wherein the function of the difference between the variable that represents the phase of the bio-signal and the variable that represents the estimated phase is a covariance function.

35. (*Currently Amended*) The system of claim 24, wherein the ~~processing~~ computing device is configured to multiply the estimated phase by a factor to produce the function of the bio-signal.

36-40. (*Canceled*)